

CLAIMS

1. A blower for a breathing apparatus comprising:
a bottom support for a shaft,
5 a top support for a shaft,
a motor core comprising a stator and rotor
an impeller coupled to the motor core via a shaft
wherein the shaft is rotatably coupled at a first end via a stub axle and bearing
arrangement to the top support and at a second end via a stub axle and bearing
10 arrangement to the bottom support.
2. A blower for a breathing apparatus according to claim 1 wherein the shaft is
rotatably coupled at the first and second ends to the stub axles by bearings in the shaft.
- 15 3. A blower according to claim 1 wherein the shaft is rotatably coupled at the first
and second ends to the top and bottom supports by stub axles and bearings in the top
and bottom supports.
- 4 A blower according to claim 1, 2 or 3 wherein the stub axle is compliant and/or
20 resilient.
5. A blower according to any one of claims 1 to 4 wherein the shaft is partially or
fully hollow and the first and second ends have bearings within the hollow.
- 25 6. A blower according to one of claims 1 to 5 wherein each bearing comprises an
inner race and an outer race, and each stub axle couples to the respective inner bearing
race.
7. A blower according to any preceding claim wherein the shaft maximum diameter
30 size is independent of the bearing diameter size.
8. A blower according to any preceding claim wherein the blower is an axial
inlet/axial outlet blower.
- 35 9. A blower according to any preceding claim wherein the blower is a single stage
axial inlet/axial outlet blower.
10. A blower according to any one of claims 1 to 7 wherein the blower is an axial
inlet/radial outlet or tangential outlet blower.

11. A blower according to any one of claims 1 to 7 or 10 wherein the blower is a single stage axial inlet/radial outlet or tangential outlet blower.
- 5 12. A blower according to any preceding claim wherein the impeller is integrally formed with the shaft or is coupled via a press-fit, over moulding or glue.
12. A blower according to any preceding claim wherein the rotor or magnet is press-fit on the shaft or coupled via over moulding or glue.
- 10 13. A blower for a breathing apparatus comprising:
a housing,
a motor core within the housing
an impeller coupled to the rotor via a shaft,
15 an airflow stator,
wherein the impeller rotates within a region within the housing and directs outlet air axially through the airflow stator ring.
14. A blower according to claim 13 wherein there is no volute.
- 20 15. A blower according to claim 13 or 14 wherein the housing comprises a lower housing with a region for the motor and one or more apertures for axially receiving inlet air.
- 25 16. A blower according to one of claims 13 to 15 wherein the blower is single stage.
17. A blower according to any one of claims 13 to 16 wherein the ratio of the impeller diameter to housing diameter is at least about 90% .
- 30 18. A blower for a breathing apparatus comprising:
a housing,
a motor core within the housing
an impeller coupled to the rotor via a shaft,
wherein the impeller comprises:
35 a hub,
blades extending from the hub, and
stub blades supported between the blades.

19. A blower according to claim 18 further comprising an annular ring extending around the blades and supporting the stub blades.
20. A blower according to claim 19 wherein the annular ring has an edge turned
5 towards the outlet to direct outlet air axially.
21. A blower according to any one of claims 18 to 20 wherein the impeller has:
ζ a diameter of less than or equal to about 53mm,
ζ a height of less than or equal to about 21mm, and/or
10 ζ a weight of less than or equal to about 50 grams, or preferably less than or equal to about 47 grams and preferably 27g.
22. A blower according to any one of claims 18 to 21 wherein the impeller is integrally
15 formed with the shaft or is coupled via a press-fit, over moulding or glue.